

# A Preliminary List of Known Opisthobranchs from the Galápagos Islands Collected by the Ameripagos Expedition

BY

GALE G. SPHON<sup>1</sup> AND DAVID K. MULLINER<sup>2</sup>

(1 Map)

## INTRODUCTION

IN MARCH 1971, seven professional and amateur malacologists, calling themselves the Ameripagos Expedition, visited the Galápagos Islands, Ecuador. With the permission of the Charles Darwin Research Station, numerous species of mollusks were collected. Approximately 25 opisthobranch species were obtained from 38 stations. These stations ranged from intertidal to 38 m in depth. Eleven of the opisthobranch species are included in this report.

The opisthobranch fauna (other than shelled cephalaspideans) of the Galápagos has been neglected by previous workers. PILSBRY & VANATTA (1902: 556) report *Doris peruviana* Orbigny, 1837 and EALES (1966: 364) cites *Aplysia juliana* Quoy & Gaimard, 1834. KEEN (1971: 812) also reports *Tylodina fungina* Gabb, 1865. These are the only 3 species we have been able to find recorded in the literature. Only *Tylodina* was collected by the expedition.

The names of the islands used in this paper are the mixture of the Spanish and English names in common usage among the inhabitants of the archipelago.

Unless otherwise noted, at least one voucher specimen of each species discussed in this paper is deposited at the Los Angeles County Museum of Natural History. The specimens from Nayarit, Mexico, that are mentioned, have been deposited there also either as preserved specimens or radula slides.

## STATION OBSERVATIONS

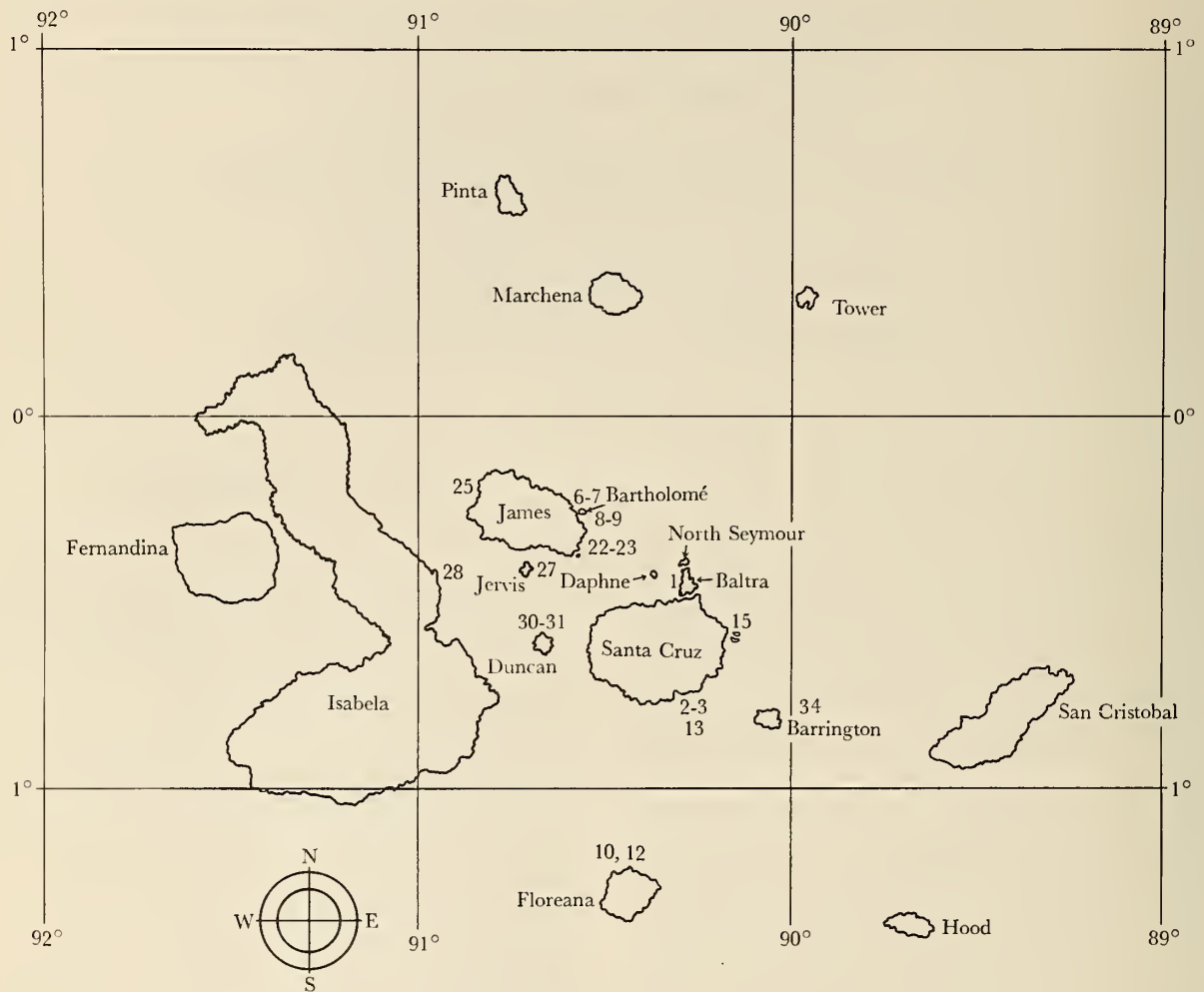
With the exception of the collections made at the Charles Darwin Research Station at Academy Bay, Santa Cruz Island, and Sullivan and Bartolomé Bays on Bartolomé Island, only a few hours were spent collecting at the other stations. This limited the amount and variety of opisthobranchs that could be taken.

Most intertidal collections were made from lava rocks well cemented to the substrate. At the southwest corner of Baltra Island (station 18) there were few mollusks even though the area appears as though it should abound with them. A lava ledge extends out some distance, and it was one of the few areas where there were many small tide pools and turnable rocks. However, there was a yellowish clay-like sediment present that may have been an inhibiting factor for the intertidal mollusks. Only at this station did we find this peculiar sediment. In contrast, another site we observed close-up on Baltra was the boat docking area (station 1). Even though we made no attempt to collect opisthobranchs from station 1, the shoreline was made up of the characteristic Galápagos lava and did not have the peculiar yellowish clay-like sediment.

Flamingo Cove, near Post Office Bay on Floreana Island (station 10) has several large shallow pools with many small and medium sized rocks and was the only place where we found the green alga, *Caulerpa racemosa* Forskal & J. Agardh var. *occidentalis* C. Agardh & Borgesen. *Caulerpa* is well known for being host to a variety of sacoglossans. Although this is the only station where we actually encountered the alga, we were told by several people who live on the islands that it is not uncommon in the archipelago.

<sup>1</sup> Curatorial Assistant, Invertebrate Zoology, Los Angeles County Museum of Natural History, Los Angeles, California 90007

<sup>2</sup> Research Associate, San Diego Natural History Museum, San Diego, California 92112



Ameripagos Expedition Collecting Stations  
for the Galápagos Islands, Ecuador

Station  
Number

- 1 Boat dock, Baltra Island;  $0^{\circ}25'30''$  S,  $90^{\circ}15'17''$  W; intertidal
- 2 Charles Darwin Research Station, Academy Bay, Santa Cruz Island;  $0^{\circ}45'05''$  S,  $90^{\circ}15'38''$  W; intertidal
- 3 Charles Darwin Research Station, Academy Bay, Santa Cruz Island;  $0^{\circ}45'05''$  S,  $90^{\circ}15'38''$  W; in 1 to 3 meters
- 6 Sullivan Bay, Bartolomé Island;  $0^{\circ}17'20''$  S,  $90^{\circ}33'30''$  W; intertidal
- 7 Sullivan Bay, Bartolomé Island;  $0^{\circ}17'20''$  S,  $90^{\circ}33'30''$  W; in 1 to 3 meters
- 8 Bartolomé Bay, Bartolomé Island;  $0^{\circ}17'S$ ,  $90^{\circ}33'30''$  W; intertidal
- 9 Bartolomé Bay, Bartolomé Island;  $0^{\circ}17'S$ ,  $90^{\circ}33'30''$  W; in 1 to 3 meters
- 10 Flamingo Cove, near Post Office Bay, Floreana Island;  $1^{\circ}14'S$ ,  $90^{\circ}27'30''$  W; intertidal
- 12 Corona del Diablo, near Post Office Bay, Floreana Island;  $1^{\circ}14'S$ ,  $90^{\circ}27'30''$  W; in 2 to 4 meters
- 13 Academy Bay, Santa Cruz Island;  $0^{\circ}25'S$ ,  $90^{\circ}15'38''$  W; 15 to 30 meters
- 15 South side of North Plaza Island;  $0^{\circ}34'36''$  S,  $90^{\circ}09'40''$  W; intertidal
- 18 Southwest corner of Baltra Island;  $0^{\circ}29'20''$  S,  $90^{\circ}17'40''$  W; intertidal
- 22 Sombrero Chino Island;  $0^{\circ}22'20''$  S,  $90^{\circ}17'40''$  W; intertidal
- 23 Sombrero Chino Island;  $0^{\circ}22'20''$  S,  $90^{\circ}34'30''$  W; in 1 to  $2\frac{1}{2}$  meters
- 27 Jervis Island;  $0^{\circ}25'S$ ,  $90^{\circ}42'W$ ; in 3 to 23 meters
- 28 Punta Alfaro, Isabela Island;  $0^{\circ}25'20''$  S,  $90^{\circ}57'10''$  W; intertidal
- 30 Duncan Island;  $0^{\circ}35'50''$  S,  $90^{\circ}39'15''$  W; intertidal
- 31 Duncan Island;  $0^{\circ}35'50''$  S,  $90^{\circ}39'15''$  W; in 1 to 3 meters
- 34 Barrington Island;  $0^{\circ}51'30''$  S,  $91^{\circ}02'30''$  W; intertidal

Punta Alfaro, Isabela Island (station 28), was like most of the other areas where intertidal collecting was done, except for having a rocky rubble bar that is uncovered at low tide. There were also a few dead coral heads that had lodged on the bar, indicating that coral was present in the area.

Duncan Island (station 30) was, considering the short time we had there, the most productive of all our stations for opisthobranchs. We collected at a small cove or inlet protected by a large mass of rock that was almost big enough to be called an islet. Within the cove, the shoreline is the typical lava boulder type found throughout the archipelago. However, the bottom of the cove is made up of sand with large areas of living coral that can be easily reached by wading knee-deep at low tide. The diversification of habitats probably accounted for the variety of dorids, aeolids, sacoglossans, and pleurobranchs we found there.

### SPECIES OBSERVATIONS

*Bulla punctulata* A. Adams, in Sowerby, 1850

KEEN (1971) reported this species from Magdalena Bay, Baja California, Mexico, to Peru. It is the only species of shelled cephalaspidean that was found by this expedition.

This species was not taken alive intertidally; however, beach specimens were collected at Flamingo Cove (station 10), the south side of North Plaza Island (station 15) and the southwest corner of Baltra Island (station 18). Living specimens were taken from 1 - 3 m at the Darwin Research Station (station 3), from 2 - 4 m at Flamingo Cove (station 12), from 1 - 2½ m at Sombrero Chino Island (station 23), and at Duncan Island stations 31 (1 - 3 m), and 34 (10 - 25 m).

*Dolabrifera dolabrifera* (Rang, 1828)

This is a circumtropical and circumsubtropical species that has recently been reported from the eastern Pacific. BERTSCH (1970) based his record on one specimen collected at Las Cruces Bay, Baja California, Mexico (20 miles east of La Paz). It has also been taken at Cholla Bay, Sonora, Mexico, by Wesley Farmer and from Mazatlan, Sinaloa, Mexico by Antonio Ferrera (personal communications). We extend the range from the Gulf of California to the Galápagos Islands.

We collected this species at 6 localities: intertidally at Sullivan Bay, Bartolomé Island (station 6); Flamingo Cove, Floreana Island (station 10); Duncan Island (station 30); Sombrero Chino Island (station 22); on the bar

at Punta Alfaro, Isabela Island (station 28); and intertidally and to 2 m at the Darwin Research Station, Santa Cruz Island (station 2).

*Tylodina fungina* Gabb, 1865

This is a moderately common species and the recorded northern limit is Cayucos, San Luis Obispo County, California (SPHON & LANCE, 1968). From there its range extends to Todos Santos, Baja California, Mexico. DUSHANE (1966) reports it from Punta Colorado in the Guaymas area of Sonora, Mexico. McBETH & BOWLUS (1969) report it from Espíritu Santo Island in the Gulf of California, and KEEN (1971) reports it from Costa Rica as well as from the Galápagos Islands. We collected 2 specimens intertidally at Bartolomé Bay (station 8) and 2 additional specimens were collected from 2 - 4 m at Corona del Diablo, Floreana Island (station 12). All 4 animals were living on a bright yellow sponge which is the typical habitat for the species in southern California.

*Umbraculum ovale* (Carpenter, 1856)

KEEN (1971) reports this species as occurring from Cape San Lucas, Baja California, Mexico, to Panama. One specimen was taken in 1 - 3 m of water in Sullivan Bay, Bartolomé Island (station 7). This record extends the range of the species south from Panama to the Galápagos Islands.

The single specimen collected by the expedition is in the private collection of Mrs. Jackey Grundman, Downey, California.

*Berthelinia chloris* (Dall, 1918)

*Berthelinia chloris* is one of the sacoglossans that live and feed exclusively on the green alga *Caulerpa racemosa*. It resembles its host plant in color and can generally only be seen in the field when the light strikes the shiny shell in the duller algae. Nineteen specimens were collected intertidally at Flamingo Cove, Floreana Island (station 10). This was the only station where we saw *Caulerpa*.

The specimens were all attached by a mucous thread fastened near the base of the plant. No specimens were found on the younger portions of the alga. This may be due to the fact that they were collected at low tide when the *Caulerpa* was either out of water or in warm shallow pools no more than 45 cm deep. When the animals are disturbed, they are able to withdraw completely into the shell and close it tightly.

KEEN (1971) reports this species from Punta Abrejos, on the Pacific side of Baja California, Mexico, to the southern end of the Gulf of California and, possibly, at

Guaymas, Sonora, Mexico. We are able to extend the range of the species to the Galápagos Islands.

*Lobiger souverbiei* Fischer, 1856

While it was known for some years that this species occurs in the eastern Pacific, it has only been reported from Santa Cruz, Nayarit, Mexico, living on *Caulerpa* (SPHON, 1971a). This is a circumtropical species that is also found in Hawaii and the Caribbean.

Four specimens of this species were found on *Caulerpa racemosa* var. *occidentalis* from the intertidal region of Flamingo Cove, Floreana Island (station 10). It is probable that both this species and *Berthelinia* would be found where *Caulerpa* occurs. Both seem to live and feed exclusively on this green alga.

*Berthellina engeli* Gardiner, 1936

As BERTSCH (1970) pointed out when he rejected the subspecific taxon *Berthellina engeli ilisima* Marcus & Marcus, 1967, a decision on the validity of the species will have to await the examination of the holotype. Even though KEEN (1971) elevated *B. e. ilisima* to specific rank as a valid taxon, we consider that there is not enough difference between the Caribbean and Panamic specimens for even subspecific differentiation. We agree with Bertsch's conclusion that these animals should be considered as one species — *Berthellina engeli* Gardiner, 1936. The distribution is not an unusual one for opisthobranchs, as there are many species that occur world-wide in tropical or subtropical seas.

The northernmost locality record is one specimen reported by LEE & BROPHY (1969) from 7½m off Santa Cruz Island, Santa Barbara County, California. It has also been taken several times in the Palos Verdes Peninsula area of Los Angeles County, California by Donald Cadien (personal communication). BERTSCH (1970) cites many localities throughout the Gulf of California, Mexico, that have been mentioned in the literature.

We collected this species at 4 stations in the Galápagos Islands, and it is probably the most common externally shell-less opisthobranch occurring in the archipelago. Many more specimens were noted than were collected. The stations from which we have intertidal collections are: the Darwin Research Station at Academy Bay (stations 2 and 3); Flamingo Cove (station 10); and Duncan Island (station 30). In addition, 2 specimens were taken in 30m at a reef in Academy Bay (station 13).

Most of the specimens seen were the brilliant orange color that gives this species the common name of "orange blob." The one exception to this coloration was a specimen collected intertidally at Duncan Island (station 30) that was a bright lemon yellow. The radula, jaw plates,

and shell are the same as those of the orange *Berthellina engeli*.

*Pleurobranchus (Pleurobranchus) areolatus* (Mörch, 1863)

MARCUS & MARCUS (1967) report this species from Florida to the Canal zone, Panama, in the western Atlantic and from Punta Peñasco to Guaymas, Sonora, Mexico, in the eastern Pacific. BERTSCH (1971) reports it from the Las Cruces Bay area in Baja California, Mexico. The senior author also took this species intertidally at Sayulita, Nayarit, Mexico, in January 1970, and KEEN (1971) extends the range to western Panama. Our collection records enable us to extend the range to the Galápagos Islands. We took one specimen from the intertidal area in Sullivan Bay (station 6) and one specimen from the intertidal area at Flamingo Cove (station 10). Two additional specimens were collected from 10½m at Jervis Island (station 27).

*Chromodoris baumannii* Bertsch, 1970

In his original description of the species, BERTSCH (1970) cites locality records in the La Paz region of Baja California, Mexico, and from 20m in the Guaymas area of Sonora, Mexico. In January of 1970, the senior author also collected this species from the Santa Cruz and Sayulita areas in Nayarit, Mexico, where it was fairly abundant intertidally.

This species was photographed by Mr. Allyn G. Smith of the California Academy of Sciences, San Francisco, California, on his visit to Academy Bay in 1964 (personal communication). We also collected one specimen intertidally at the Darwin Research Station (station 2).

*Chromodoris sedna* (Marcus & Marcus, 1967)

Even though this species has only recently been named, it has long been known to be one of the most common nudibranchs from the Gulf of California to Nayarit, Jalisco, and Colima, in Mexico. The single specimen collected by us was taken intertidally at the Darwin Research Station on Academy Bay (station 2).

*Hypselodoris agassizi* (Bergh, 1894)

This species was synonymized with *Hypselodoris californiensis* (Bergh, 1879) by PRUVOT-FOL (1959) and only recently reinstated as a valid species (SPHON, 1971b).

*Hypselodoris agassizi* ranges south along the Sonora coast of the Gulf of California in Mexico to its type locality in Panama. One specimen was collected intertidally at the Darwin Research Station on Academy Bay (station 2), and extends the range southward to the Galápagos Islands. Possibly it may range south to Peru or even to northern Chile.

Table 1

Species Collected	Collecting Stations																		
	2	3	6	7	8	9	10	12	13	15	18	22	23	27	28	30	31	34	
<i>Bulla punctulata</i> A. Adams, 1850		×					×	×		×	×		×					×	×
<i>Dolabrifera dolabrifera</i> (Rang, 1828)	×	×					×						×			×	×		
<i>Tylodina fungina</i> Gabb, 1865					×			×											
<i>Umbraculum ovale</i> (Carpenter, 1856)					×														
<i>Berthelina chloris</i> (Dall, 1918)								×											
<i>Lobiger souverbiei</i> Fischer, 1856								×											
<i>Berthelina engeli</i> Gardner, 1936	×	×						×		×									×
<i>Pleurobranchus areolatus</i> (Mörch, 1863)			×					×						×					
<i>Chromodoris baumanni</i> Bertsch, 1970		×																	
<i>Chromodoris sedna</i> (Marcus & Marcus, 1967)		×																	
<i>Hypselodoris agassizi</i> (Bergh, 1894)		×																	

## ACKNOWLEDGMENTS

We wish to extend our thanks to Twila Bratcher, Jackey Grundman, William E. Old, Jr., and Carolyn Stover for their help in the field. We also wish to thank Hans Bertsch, William K. Emerson, Richard Roller, Allyn G. Smith, and Edward Wilson for having critically read the manuscript. Most particularly, we wish to thank Mrs. Eveline Marcus for critically reading the manuscript and for her encouragement.

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